

**Advanced Chemistry**  
**Gas Law Problems**

**NAME:** \_\_\_\_\_ **PER:** \_\_\_\_\_

*Instructions: Carry out the following law problems. SHOW ALL WORK in the empty space below the questions. Write the final answer on the blanks provided. Remember the units. If needed, round to the nearest tenths place.*

**Boyle's Law**

1. Four liters of carbon dioxide have a pressure of 1.5 atmospheres (atm). If the original pressure was 0.9 atmospheres (atm), what was the original volume?

1. \_\_\_\_\_

2. 3 gallons of argon were at a pressure of 14 pounds per square inch. A pressure change then reduces the volume to 2.2 gallons. What is the new pressure?

2. \_\_\_\_\_

3. A gas occupies 1.56 L at 1.00 atm. What will be the volume of this gas if the pressure becomes 3.00 atm?

3. \_\_\_\_\_

4. A gas occupies 11.2 liters at 0.860 atm. What is the pressure if the volume becomes 15.0 L.

4. \_\_\_\_\_

5. 13. A gas occupies 4.31 liters at a pressure of 0.755 atm. Determine the volume if the pressure is increased to 1.25 atm.

5. \_\_\_\_\_

## Charles' Law

6. The temperature inside my refrigerator is about  $4^{\circ}$  Celsius. If I place a balloon in my fridge that initially has a temperature of  $22^{\circ}$  C and a volume of 0.5 liters, what will be the volume of the balloon when it is fully cooled by my refrigerator?

6. \_\_\_\_\_

7. A man heats a balloon in the oven. If the balloon initially has a volume of 0.4 liters and a temperature of  $20^{\circ}$ C, what will be the volume of the balloon be after he heats it to a temperature of  $250^{\circ}$  C?

7. \_\_\_\_\_

8. On hot days, you may have noticed that potato chips bags seem to "inflate", even though they have not been opened. If I have a 250 mL bag at a temperature of  $19^{\circ}$ C, and I leave it in my car which has a temperature of  $60^{\circ}$ C, what will the new volume of the bag be?

8. \_\_\_\_\_

9. A soda bottle is flexible enough that the volume of the bottle can change even without opening it. If you have an empty soda bottle with a volume of 2 liters at room temperature ( $25^{\circ}$ C), what will the new volume be if you put it in your freezer ( $-4^{\circ}$ C)?

9. \_\_\_\_\_

10. How hot will a 2.3-liter balloon have to get to expand to a volume of 400 liters? Assume that the initial temperature of the balloon is  $25^{\circ}$ C.

10. \_\_\_\_\_

## Avogadro's Law

11. A sample of gas occupies 2.00 L with 5.00 moles present. What would happen to the volume if the number of moles is increased to 10.0?

11. \_\_\_\_\_

12. What happened to the number of moles of gas in a sample that originally occupied 500 mL with 2.50 moles and then occupied 750 mL?

12. \_\_\_\_\_

13. 5.00 L of a gas is known to contain 0.965 mol. If the amount of gas is increased to 1.80 mol, what new volume will result?

13. \_\_\_\_\_

14. A cylinder with a movable piston contains 2.00 g of helium, He, at room temperature and a pressure of 2.00 L. More helium was added to a cylinder and the volume changed to 2.70 L. How much helium was added?

14. \_\_\_\_\_

15. If 0.00810 mol neon gas at a particular temperature and pressure occupies a volume of 214 mL, what volume would 0.00684 mol neon gas occupy under the same conditions?

15. \_\_\_\_\_